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Description of two new fossil figs from Wyoming and Montana *

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The fossil fruits herein described have been in hand for many years awaiting the completion of a large general work that should deal fully with the floras of certain of the Upper Cretaceous and Lower Tertiary formations of the Rocky Mountain region. As a wealth of new material has yearly continued to pour in from these horizons, the completion of the work has been of necessity delayed, and it may still be some time before it can be finished. In the meantime it seems desirable that some of the more striking or interesting of the new forms should be published in order that they may be made available for the use of other workers in the field. The present paper, which will be followed by others, deals with two remarkable fruits of *Ficus* from Wyoming and Montana.

Ficus Ceratops sp. nov.

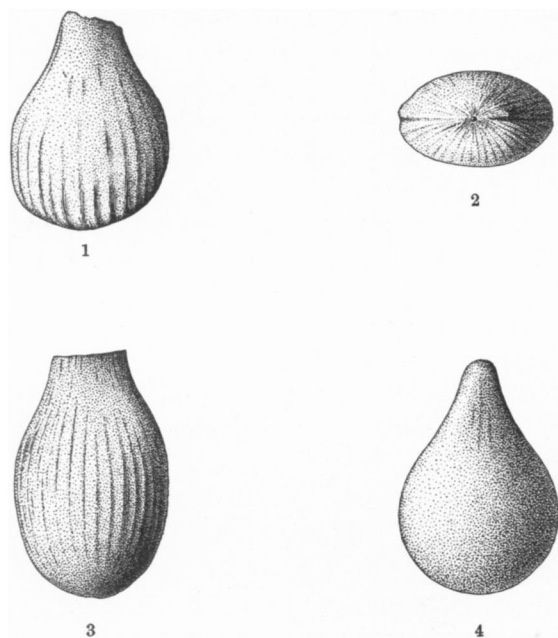
Palmocarpus n. sp. Knowlton, in Stanton and Knowlton, Bull. Geol. Soc. Am. 8: 136. 1897.

Fruits pearshaped or obovoid in shape, narrowed proximally into a thick neck (usually broken), and globose expanded distally; walls thick and apparently woody in texture, usually provided with numerous, more or less prominent ribs which converge in the narrowed neck; apex rounded and obtuse or slightly depressed to a small pit or apparent opening into the interior; seeds absent, the interior being filled with coarse sandstone of the matrix. [See FIGURE.]

These remarkable and admirably preserved specimens, of which there are nearly one hundred before me, were collected by the late J. B. Hatcher on June 24, 1881, in Converse County, Wyoming, in beds of the Lance formation, which contained abundant remains of the now well known horned dinosaurs. They were thought by the collector to be the bulbs of some monocotyledonous plant, and this supposed resemblance is by no means far fetched. They were all found within a very small area, and, according to Mr. Hatcher, each one when discovered was resting with the large globular

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end downward, a position that heightened their resemblance to small bulbs, at least to the casual observer. Without careful study they were supposed to be palm fruits, and in the paper above mentioned they are recorded as a new species of *Palmocarpon*. But on careful study it appeared that they failed to meet the requirements for a reference to the palms, and in casting about for possible relationship it was suggested to me by Mr. F. V. Coville,



Ficus Ceratops sp. nov. 1, 3, and 4, side views of fruits; 2, end view of 1.

botanist of the United States Department of Agriculture, that they were probably fruits of a species of *Ficus*, and such they undoubtedly are. In the seed collection of the United States National Herbarium I find (no. 11,713) a single woody fruit of a *Ficus*—unfortunately without specific name—from Egypt that is hardly to be distinguished from them. This is of approximately the same size and is of precisely the same shape and appearance as the fossils, having a thick woody “shell” provided with numerous somewhat finer ribs or striae, the main point of difference being in the apex, where the entrance to the interior cavity is much larger and practically closed by a woody diaphragm or protuber-

ance from the interior. In the fossils the presence of this pore is demonstrable, but it must have been much smaller and not provided with anything like a diagram. Curiously enough the fossils show little if any evidence of pressure or distortion, which is probably to be accounted for by the fact that the beds in which they occur are nearly horizontal and exhibit no evidence of having been much disturbed since their deposition. They have what was probably a thick, woody "shell," which in all cases appears to have been broken across the neck or basal portion just above the point of attachment, thus permitting access to the interior cavity. This cavity is now filled with the coarse sandstone of the general matrix, mixed with certain extraneous matter, as bits of vegetation, fragments of shells, etc. In no case was the cavity found to contain seeds, which seems rather remarkable considering the fine state of preservation of the fruit as a whole. It seems probable that when the neck was broken the larger, globose end, being heavier, floated downward and the fruits were filled and covered up in this upright position in which they are found.

It should be mentioned that the approximate size of these fruits is as follows: length 2 to 3.5 cm., diameter of neck usually a little less than 1 cm., and the diameter of the globular portion about 2 cm. While these sizes are much larger than the average living *Ficus* fruit there are a number of well-known species having them even larger, such, for instance, as the Indian *F. punctata* Thunb., *F. callicarpa* Miq., and others.

Fruits of *Ficus* in a fossil state are of unusual occurrence and none, so far as I know, has been described that can be removed from the matrix practically perfect. Thus Heer in 1874 described *Ficus protogaea** from the Atane beds of Greenland, and in the Dakota group Lesquereux has found two fruits which he figures† without specific name. More recently Hollick has described and figured‡ another species as *F. neurocarpa* from the Dakota group of Ellsworth County, Kansas, and Cockerell§ has established a species (*F. Bruesi*) from the Miocene of Florissant, Colorado.

* Fl. Foss. Arc. 3²: 108. pl. 30. f. 5-7. 1874.

† Mon. U. S. Geol. Surv. (Fl. Dak. Gr.) 19: 85. pl. 10. f. 7, 8. 1891.

‡ Bull. Torrey Club 30: 105. f. 1. 1903.

§ Torreya 10: 223. 1910. [Illust.]

No *Ficus* fruits have been before described from the Laramie or any of the related formations.

It is of course impossible to connect these fruits with leaves of *Ficus* in the same beds, though it is possible they may have belonged to a certain large-leaved species present.

OCCURRENCE: Lance formation ("Ceratops beds"), Lance Creek, Converse County, Wyoming. Collected by J. B. Hatcher, June 1881. Types in United States National Museum. Also found in the Lance formation ("Hell Creek beds") on Hell Creek, Montana, by Barnum Brown of the American Museum of Natural History, in which institution these specimens now are.

***Ficus Russelli* sp. nov.**

Fruits similar to the preceding but in general much larger, with coarser, more prominent ribs.

It is perhaps doubtful if this should be considered as specifically distinct from the last. In manner of preservation and general appearance they are identical, but the largest example from Converse County scarcely reaches the size of the smallest specimen under consideration. Thus one of the smallest examples is about 3 cm. long and has a diameter of fully 2.5 cm., while the largest somewhat exceed a length of 4 cm. and a diameter of 3 cm. The pit or depression at the apex showing the point of entrance into the interior is perhaps more prominent and seemingly larger, but it must be confessed the differences are not great.

The material upon which this species is based, numbering between thirty and fifty very perfectly preserved specimens, was collected by Prof. I. C. Russell near Forsyth, Montana. The matrix is a shattered, calcareous sandstone and the fruits are imbedded at irregular distances and in all positions, and yet none is distorted in the least. Associated with the fruits are numerous fragmentary shells belonging to five or six species; and a few fragments of leaves were found in the same beds but unfortunately they are not determinable.

OCCURRENCE: Lance formation ("Ceratops beds"), Forsyth, Montana. Collected by I. C. Russell. Types in the United States National Museum.

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